



UNIVERSITY OF NOVI SAD
FACULTY OF SCIENCES
DEPARTMENT OF MATHEMATICS
AND INFORMATICS



XVIII Conference on Applied Mathematics
PRIM 2009
Subotica, May 25–27, 2009

Book of Abstracts

XVIII Conference on Applied Mathematics "PRIM 2009"
Subotica, May 25-27, 2009

PROGRAM COMMITTEE

Dragoslav Herceg, Novi Sad, chair
Zoran Budimac, Novi Sad
Dragan Đorđević, Niš
Boško Jovanović, Belgrade
Vera Kovačević-Vujčić, Belgrade
Nataša Krejić, Novi Sad
Dragan Mašulović, Novi Sad
Gradimir Milovanović, Niš
Ljiljana Petković, Niš
Miodrag Petković, Niš
Miloš Racković, Novi Sad
Miodrag Spalević, Belgrade
Katarina Surla, Novi Sad
Arpad Takači, Novi Sad
Đurđica Takači, Novi Sad

ORGANIZING COMMITTEE

Helena Zarin, chair
Đorđe Herceg
Sanja Rapajić
Goran Radojev
Nada Aleksić

Conference supported by

Ministry of Science and Technological Development, Republic of Serbia
Provincial Secretariat for Science and Technological Development, AP Vojvodina
Provincial Secretariat for Education, AP Vojvodina
Faculty of Sciences, University of Novi Sad

PRIM 2009 – CONFERENCE SCHEDULE

25.5.2009.

- 09:00-12:00** **REGISTRATION**
- 12:00-12:30** **OPENING OF THE CONFERENCE**
- 12:30-14:00** **WELCOME RECEPTION & COCKTAIL**
- 14:00-15:00** **PLENARY LECTURE**
Boško Jovanović
A CLASS OF NONLOCAL TRANSMISSION PARABOLIC PROBLEMS
- 15:00-16:00** **PLENARY LECTURE**
Zorana Lužanin
NUMERICAL METHODS FOR PROBLEMS OF STOCHASTIC OPTIMIZATION
- 16:00-16:30** **COFFEE BREAK**
- 16:30-17:30** **SHORT COMMUNICATIONS**
- 17:30-17:50** **COFFEE BREAK**
- 17:50-18:50** **SHORT COMMUNICATIONS**

26.5.2009.

- 09:00-10:00** **PLENARY LECTURE**
Miodrag Petković
THE PROOF OF THE KUNG-TRAUB CONJECTURE
- 10:00-11:00** **SHORT COMMUNICATIONS**
- 11:00-11:30** **COFFEE BREAK**
- 11:30-13:10** **SHORT COMMUNICATIONS**
- 13:10-15:00** **LUNCH**
- 15:00-16:00** **SHORT COMMUNICATIONS**
- 16:00-16:30** **COFFEE BREAK**
- 16:30-18:30** **SHORT COMMUNICATIONS**
- 20:00-22:00** **CONFERENCE DINNER**

27.5.2009.

- 09:00-10:00** **SHORT COMMUNICATIONS**
- 10:00-10:20** **COFFEE BREAK**
- 10:20-12:10** **SHORT COMMUNICATIONS**
- 12:10-14:30** **LUNCH**
- 14:30-15:50** **SHORT COMMUNICATIONS**
- 16:00** **CLOSING OF THE CONFERENCE**

PRIM 2009 – CONFERENCE SCHEDULE

25.5.2009. Numerical mathematics

- 16:30-16:50** **Miodrag Spalević**
ON THE REMAINDER TERM OF GAUSSIAN QUADRATURES FOR ANALYTIC FUNCTIONS
- 16:50-17:10** **Zlatko Udovičić**
ONE POINT QUADRATURE RULE WITH CARDINAL B-SPLINE
- 17:10-17:30** **Nenad Cakić**
ON THE JACOBI-STIRLING NUMBERS
- 17:50-18:10** **Ljiljana Petković**
ON THE TREE-STEP ITERATIVE METHODS FOR SOLVING NONLINEAR EQUATIONS
- 18:10-18:30** **Katarina Surla**
A UNIFORM SPLINE COLLOCATION METHOD FOR A REACTION-DIFFUSION PROBLEM
- 18:30-18:50** **Zorica Milovanović**
ABOUT SOME SPECTRAL PROBLEMS CONTAINING DIRAC DISTRIBUTION

26.5.2009. Numerical mathematics

- 15:00-15:20** **Dragoslav Herceg**
ON A FOURTH-ORDER FINITE DIFFERENCE SCHEME
- 15:20-15:40** **Branko Prentović**
NUMERICAL SOLVING OF A NONLOCAL SINGULARLY PERTURBED PROBLEM ON A SPECIAL NONEQUIDISTANT MESH
- 15:40-16:00** **Ljiljana Teofanov**
A UNIFORM NUMERICAL METHOD FOR SEMILINEAR REACTION-DIFFUSION PROBLEMS WITH A BOUNDARY TURNING POINT
- 16:30-16:50** **Đorđe Herceg**
FOURTH-ORDER FINITE-DIFFERENCE METHOD FOR BOUNDARY VALUE PROBLEMS WITH TWO SMALL PARAMETERS
- 16:50-17:10** **Helena Zarin**
DISCONTINUOUS GALERKIN APPROXIMATIONS OF SINGULARLY PERTURBED BOUNDARY VALUE PROBLEMS
- 17:10-17:30** **Goran Radojev**
RICHARDSON EXTRAPOLATION FOR A CONVECTION-DIFFUSION PROBLEM USING A QUADRATIC SPLINE COLLOCATION METHOD ON A SHISHKIN MESH
- 17:30-17:50** **Katarina Vla**
SAMPLE-PATH OPTIMIZATION FOR CONSTRAINED PROBLEMS
- 17:50-18:10** **Nataša Krklec**
NON-MONOTONE LINE-SEARCH TECHNIQUE FOR CONSTRAINED PROBLEMS IN NOISY ENVIRONMENT
- 18:10-18:30** **Sanja Rapajić**
JACOBIAN SMOOTHING IN METHOD FOR NCP WITH A SPECIAL CHOICE OF FORCING TERMS

PRIM 2009 – CONFERENCE SCHEDULE

26.5.2009. Applied mathematics

- 10:00-10:20** **Bojana Mihailović**
A NEW CLASS OF MAXIMAL TRICYCLIC REFLEXIVE CACTI
- 10:20-10:40** **Radoslav Milošević**
SOME CHARACTERISTICS OF RECURSIVE STRUCTURES
- 10:40-11:00** **Miroslav Petrović**
TRICYCLIC GRAPHS FOR WHICH THE LEAST EIGENVALUE IS MINIMUM
- 11:30-11:50** **Nenad Teofanov**
MOBILE COMMUNICATION SYSTEMS AS A MOTIVATION FOR THE STUDY OF PSEUDODIFFERENTIAL OPERATORS
- 11:50-12:10** **Dejana Herceg**
ON SOME PROPERTIES OF THE AIR-CORED MEASURING TRANSFORMER
- 12:10-12:30** **Karolina Nemeš**
THE IMPROVEMENT OF RIVER STRETCH CHARACTERIZATION FROM RELATIVE DIFFERENCES OF FUNCTIONS
- 12:30-12:50** **Nebojša Stojković**
FINDING INITIAL BASIC FEASIBLE SOLUTION IN SIMPLEX ALGORITHM

27.5.2009. Applied mathematics

- 09:00-09:20** **Nada Damljanović**
A ROOT PRODUCT OF LATTICES
- 09:20-09:40** **Žarko Popović**
CONGRUENCES AND SEMILATTICES OF ARCHIMEDEAN SEMIGROUPS
- 09:40-10:00** **Bratislav Iričanin**
ON SOME RATIONAL DIFFERENCE EQUATIONS' TREATMENT: QUALITATIVE VS. ANALYTIC
- 10:20-10:40** **Ljiljana Gajić**
ON SOME OPTIMIZATION PROBLEM
- 10:40-11:00** **Marija Obradović**
ABOUT PLANAR SECTIONS OF A TYPE OF EGG CURVE BASED CONOID
- 11:00-11:20** **Rale Nikolić**
THE WEAK ASYMPTOTIC EQUIVALENCE AND THE GENERALIZED INVERSE
- 11:20-11:40** **Tijana Levajković**
CHAOS EXPANSIONS OF GENERALIZED RANDOM PROCESSES
- 11:40-12:10** **Tatjana Lutovac**
SOME CONTRIBUTIONS TO AUTOMATED REASONING ABOUT PERMUTATIONS IN SEQUENT CALCULI PROOF SEARCH
- 14:30-14:50** **Sladana Marinković**
ON THE CONCEPTS OF ALMOST ORTHOGONALITY
- 14:50-15:10** **Predrag Rajković**
THE GENERALIZED BORWEIN CONJECTURE AND PARTITIONS OF NATURAL NUMBERS
- 15:10-15:30** **Jelena Stanojević**
RELATION BETWEEN HEAVY TAILS, SELF-SIMILARITY AND LONG-RANGE DEPENDENCE
- 15:30-15:50** **Marina Milovanović**
FINANCIAL MATHEMATICS AS A BASIS FOR INVESTMENT PLANNING AND EVALUATION OF THEIR ECONOMIC EFFICIENCY

PRIM 2009 – CONFERENCE SCHEDULE

26.5.2009. Informatics

- 15:00-15:20 Jelena Hadži-Purić**
CLUSTERING NUMERICAL AND NOMINAL DATA: HYBRID APPROACH
- 15:20-15:40 Davorka Radaković**
DYNAMIC STRONGLY TYPED EXPRESSION EVALUATOR
- 15:40-16:00 Dragana Todorčić-Vukašin**
USE OF ORACLE WORKFLOW MANAGEMENT SYSTEM IN THE STUDENT AFFAIRS INFORMATION SYSTEM
- 16:30-16:50 Milorad Banjanin**
PRINCIPLES OF DESIGNING INSTRUCTIVE DISPLAYS FOR THE INTERACTION MAN-SYSTEM
- 16:50-17:10 Gordana Rudić**
MODELLING CONSTRAINTS ON MARC 21 BIBLIOGRAPHIC RECORDS
- 17:10-17:30 Dragan Ivanović**
SYSTEM SOFTWARE ARCHITECTURE OF BIBLIOGRAPHIC DATA
- 17:30-17:50 Ivan Pribela**
TESTING STUDENTS' PROGRAMMING ASSIGNMENTS
- 17:50-18:10 Gordana Rakić**
TOWARDS THE BETTER SOFTWARE METRICS TOOL

PRIM 2009 – CONFERENCE SCHEDULE

26.5.2009. Teaching of mathematics and computer science

- 10:00-10:20** **Đurđica Takači**
ADVANCE MATHEMATICAL THINKING AND COMPUTER
- 10:20-10:40** **Péter Körtesi**
SPECIAL MATHEMATICS FOR TALENTED UNIVERSITY STUDENTS
- 10:40-11:00** **Jelena Tatar**
INTUITIVNA PREDSTAVA "BESKONAČNOSTI"
- 11:30-11:50** **Dragoslav Herceg**
PRIBLIŽNI BROJEVI U NASTAVI MATEMATIKE
- 11:50-12:10** **Anton Vrdoljak**
THE EDUCATIONAL POTENTIAL OF DYNAMIC MATHEMATICS SOFTWARE:
THE CASE OF GEOGEBRA
- 12:10-12:30** **Branko Prentović**
ANALIZA OPŠTE KVADRATNE JEDNAČINE
- 12:30-12:50** **Eugen Ljajko**
GEOGEBRA AND HIGH SCHOOL ANALYTIC GEOMETRY INSTRUCTION
- 12:50-13:10** **Natalija Budinski**
ORIGAMI IN MATHEMATICS - AN EXAMPLE OF A TEACHING MODEL

27.5.2009. Teaching of mathematics and computer science

- 09:00-09:20** **Marina Milovanović**
THE ROLE OF MULTIMEDIA LEARNING IN TEACHING AND LEARNING
MATHEMATICS: MULTIMEDIA LESSONS ON INTEGRALS
- 09:20-09:40** **Svetlana Maletin**
RAČUNARSKE NAUKE U OSNOVNOJ I SREDNJOJ ŠKOLI U SVETU I KOD NAS
- 09:40-10:00** **Branko Malešević**
MATEMATIKA ANTIKITERA MEHANIZMA
- 10:20-10:40** **Milan Živanović**
TROUGLOVI SA CELOBROJNIM STRANICAMA I UGLOM OD 60 STEPENI
- 10:40-11:00** **Valerija Krekić Pinter**
METODA POKUŠAJA I POGREŠAKA U POČETNOJ NASTAVI MATEMATIKE
- 11:00-11:20** **Sanja Maričić**
REFORMULISANJE PROBLEMA KAO KOMPONENTA KRITIČKOG MIŠLJENJA U
POČETNOJ NASTAVI MATEMATIKE
- 11:20-11:40** **Miroslav Mladenović**
UTICAJ GRUPNOG OBLIKA RADA NA DIFERENCIRANJE U NASTAVI
MATEMATIKE
- 14:30-14:50** **Ljubica Diković**
VIZUELNI PRISTUP IZVODU FUNKCIJE PODRŽAN WEB TEHNOLOGIJAMA
- 14:50-15:10** **Miodrag Milićević**
MULTIMEDIA TOOLS APPLICATION IN EDUCATION
- 15:10-15:30** **Marija Milošević**
NAČINI PROVERE ZNANJA IZ OBLASTI INFORMATIKE UČENIKA GIMNAZIJE

Plenary Lectures

Monday 25.5.2009, 14:00-15:00	B. Jovanović	Plenary Lecture
-------------------------------	---------------------	-----------------

A CLASS OF NONLOCAL TRANSMISSION PARABOLIC PROBLEMS

In this paper, we consider a class of coupling parabolic transmission problems on a multicomponent domain with nonlocal interface conditions on parts of the boundaries of the subdomains. We concentrate our attention to a model problem with domain consisting of two disjoint rectangles, where the interaction between the rectangles is through integral coupling conditions on their sides. The study of such problems could be motivated physically by the occurrence of various nonstandard boundary and coupling conditions in contemporary physics, biology, engineering, as for example radiative heat exchange, etc. For the considered model problem we setup weak formulation and then we prove existence and uniqueness of solutions in appropriate Sobolev-like spaces. A priori estimates at different smoothness of the input data are obtained.

Boško S. Jovanović, Faculty of Mathematics, University of Belgrade

Monday 25.5.2009, 15:00-16:00	Z. Lužanin	Plenary Lecture
-------------------------------	-------------------	-----------------

NUMERICAL METHODS FOR PROBLEMS OF STOCHASTIC OPTIMIZATION

Stochastic optimization is concerned with practical procedure for decision making under uncertainty. The field is developing rapidly with contributions from many disciplines such as operations research, probability and statistics, and economics. Some popular approaches to solving problems of stochastic optimization are: gradient based search methods, stochastic approximation methods, sample path optimization, response surface methods and heuristic search methods.

Zorana Lužanin, Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad

Tuesday 26.5.2009, 09:00-10:00	M. Petković	Plenary Lecture
--------------------------------	--------------------	-----------------

THE PROOF OF THE KUNG-TRAUB CONJECTURE

The well known Kung-Traub hypothesis from 1974 conjectures that a multipoint method for solving nonlinear equations, based on $n + 1$ function evaluations, can reach the optimal order of convergence equals 2^n . This conjecture was confirmed for $n = 2$ and very recently (Bi *et al*, J. Comput. Appl. Math. 225 (2009)) for $n = 3$. This communication presents a general class of n -point iterative methods for solving nonlinear equations, constructed by combining methods of Newton's type and an arbitrary two-point fourth order method based on three function evaluations. It is proved that these methods have the convergence order 2^n requiring only $n + 1$ function evaluations per iteration. In this way it is demonstrated that the proposed methods possess as high as possible computational efficiency $2^{n/(n+1)}$ in the sense of the Kung-Traub conjecture. In other words, the new class of multipoint methods confirms the Kung-Traub conjecture for a general n . Numerical examples are included to demonstrate extraordinary convergence speed with only few function evaluations.

Miodrag S. Petković, Department of Mathematics, Faculty of Electronic Engineering, University of Niš

Section: Numerical Mathematics

Monday 25.5.2009, 17:10-17:30

N. Cakić

Numerical Mathematics

ON THE JACOBI-STIRLING NUMBERS

In this paper some new properties of the Jacobi-Stirling numbers are given. Also, we consider the generalized Jacobi-Stirling numbers.

Nenad Cakić, Faculty of Electrical Engineering, University of Belgrade

Gradimir Milovanović, Megatrend University, Belgrade

Beih El-Desouky, Faculty of Science, Port Said, Suez Canal University, Egypt

Tuesday 26.5.2009, 15:00-15:20

D. Herceg

Numerical Mathematics

ON A FOURTH-ORDER FINITE DIFFERENCE SCHEME

A number of new fourth-order accurate finite difference methods are developed for second order ordinary differential equations of the boundary value type. Schemes are obtained for both linear and nonlinear equations. In all cases, the solution of the difference equations may be accomplished using a direct elimination technique for linear tridiagonal matrix problems. We present a new nonequidistant tridiagonal scheme for second order ordinary differential equations.

Dragoslav Herceg, Đorđe Herceg, Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad

Tuesday 26.5.2009, 16:30-16:50

D. Herceg

Numerical Mathematics

FOURTH-ORDER FINITE DIFFERENCE METHOD FOR BOUNDARY VALUE PROBLEMS WITH TWO SMALL PARAMETERS

We present a finite difference scheme for a class of linear singularly perturbed boundary value problems with two small parameters. The problem is discretized using a Bakhvalov-type mesh. It is proved under certain conditions that this scheme is fourth-order accurate and that its error does not increase when the perturbation parameter tends to zero. Numerical examples are presented which demonstrate computationally the fourth order of the method.

Đorđe Herceg, Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad

Tuesday 26.5.2009, 17:50-18:10

N. Krklec

Numerical Mathematics

NON-MONOTONE LINE-SEARCH TECHNIQUE FOR CONSTRAINED PROBLEMS IN NOISY ENVIRONMENT

Many problems generate an objective function as a measurement of an experimental simulation and therefore inevitably inaccuracies occur. Such inaccuracies complicates the optimization procedure and derivative information is typically unavailable. We consider simulated response problem with constraints on decision variables where objective function is computed in noisy environment. The constraints on decision variables are given by deterministic functions. A tolerant non-monotone line search rule is proposed and analyzed. Convergence is analyzed and numerical results are discussed.

Nataša Krejić, Nataša Krklec, Katarina Vla, Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad

Monday 25.5.2009, 18:30-18:50

Z. Milovanović

Numerical Mathematics

ABOUT SOME SPECTRAL PROBLEMS CONTAINING DIRAC DISTRIBUTION

When solving the boundary problem with coefficient suspension application methods of separation of variables are obtained spectral problems in which the spectral parameter occurs in the conditions of conjugation and the boundary conditions. These problems can be described by differential equations whose coefficients contain a singular distribution, usually Dirac distribution. The solutions and spectral properties of the problem including Dirichlet's, Neumann's and Robin's boundary condition, as well as solutions and spectral properties of mixed problems are investigated.

Zorica Milovanović, Boško Jovanović, Faculty of Mathematics, University of Belgrade

Monday 25.5.2009, 17:50-18:10

Lj. Petković

Numerical Mathematics

ON THE TREE-STEP ITERATIVE METHODS FOR SOLVING NONLINEAR EQUATIONS

In this communication we present a construction of a one parameter family of two-step iterative root finding methods with great computational efficiency. Particularly, we obtain a fourth order method with only two evaluations of a function and its first derivative which puts this method into the class of optimal fourth order methods. Further acceleration of convergence speed is attained by the construction of a class of three-step algorithms with one more function evaluation. These algorithms are developed by combining the secant method and any optimal fourth order method, such as Ostrowski's, Jarratt's, King's and the others. We prove that the new three-step methods reach the sixth order of convergence. Numerical examples are included.

Ljiljana Petković, Department of Mathematics, Faculty of Mechanical Engineering, University of Niš

Tuesday 26.5.2009, 15:20-15:40

B. Prentović

Numerical Mathematics

NUMERICAL SOLVING OF A NONLOCAL SINGULARLY PERTURBED PROBLEM ON A SPECIAL NONEQUIDISTANT MESH

We present a numerical method for solving second-order linear singularly perturbed boundary value problems with a nonlocal boundary condition. We discretize the problem using a Hermite difference scheme on a special nonequidistant mesh which condenses in the layer region. The nonlocal (integral) condition has been approximated with the composite Simpson's rule on the same discretization mesh. We expect both theoretical and experimental order of convergence to be four. The package Mathematica 5.0.1 has been used in order to carry out numerical tests.

Dragoslav Herceg, Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad
Branko Prentović, VŠSSOV, Kikinda

Tuesday 26.5.2009, 17:10-17:30

G. Radojev

Numerical Mathematics

RICHARDSON EXTRAPOLATION FOR A CONVECTION-DIFFUSION PROBLEM USING A QUADRATIC SPLINE COLLOCATION METHOD ON A SHISHKIN MESH

We consider a convection-diffusion method two-point boundary value problem on a piecewise-uniform Shishkin mesh, and show that when quadratic spline collocation method is used, a version of Richardson extrapolation improves the accuracy of the computed solution. The numerical experiments confirm our theoretical results.

Katarina Surla, **Goran Radojev**, Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad

Tuesday 26.5.2009, 18:10-18:30

S. Rapajić

Numerical Mathematics

JACOBIAN SMOOTHING IN METHOD FOR NCP WITH A SPECIAL CHOICE OF FORCING TERMS

Various iterative methods for solving nonlinear complementarity problems (NCP) have been developed in recent years. We propose an inexact Newton method for solving NCP with a special choice of forcing parameters. It is based on semismooth equation reformulation of NCP by Fischer-Burmeister function and its related smooth approximation. In each iteration the corresponding linear system is solved only approximately. A nonmonotone technique is used for globalization procedure.

Nataša Krejić, **Sanja Rapajić**, Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad

Monday 25.5.2009, 16:30-16:50

M. Spalević

Numerical Mathematics

ON THE REMAINDER TERM OF GAUSSIAN QUADRATURES FOR ANALYTIC FUNCTIONS

We study the error of the Gaussian quadrature formulae when integrands which are analytic functions on a neighborhood of the interval of integration are considered. We focused on the case of one class of the Bernstein-Szegő weight functions. The quality of the derived bounds is demonstrated by a comparison with other error bounds intended for the same class of integrands.

Miodrag Spalević, Faculty of Mechanical Engineering, University of Belgrade, Serbia

Miroslav S. Pranić, Department of Mathematics and Informatics, University of Banja Luka, Faculty of Science, Bosnia and Herzegovina

Monday 25.5.2009, 18:10-18:30

K. Surla

Numerical Mathematics

A UNIFORM SPLINE COLLOCATION METHOD FOR A REACTION-DIFFUSION PROBLEM

We consider a singularly perturbed reaction-diffusion two-point boundary value problem. The problem is numerically treated by a quadratic spline collocation method on a piecewise uniform slightly modified Shishkin mesh. The position of collocation points is chosen so that the obtained scheme satisfies the discrete minimum principle. Numerical experiments indicate uniform second-order convergence of the approximate continual solution.

Katarina Surla, Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad

Ljiljana Teofanov, **Zorica Uzelac**, Department for Fundamental Disciplines, Faculty of Technical Sciences, University of Novi Sad

Tuesday 26.5.2009, 15:40-16:00

Lj. Teofanov

Numerical Mathematics

A UNIFORM NUMERICAL METHOD FOR SEMILINEAR REACTION-DIFFUSION PROBLEMS WITH A BOUNDARY TURNING POINT

This paper is concerned with a singularly perturbed semilinear reaction-diffusion problem arising in semiconductor device modeling. Its solution has boundary turning point. We prove uniqueness of the solution and related estimates on the solution and its derivatives. We consider classical finite-difference discretization on a Bakhvalov-type mesh and prove its second order accuracy in the discrete maximum norm. We present numerical results in support of this result.

Relja Vulcanović, Department of Mathematical Sciences, Kent State University Stark Campus, USA

Ljiljana Teofanov, Department for Fundamental Disciplines, Faculty of Technical Sciences, University of Novi Sad

Monday 25.5.2009, 16:50-17:10

Z. Udovičić

Numerical Mathematics

ONE POINT QUADRATURE RULE WITH CARDINAL B-SPLINE

To compute approximately an integral

$$\int_0^m \varphi_m(x) f(x) dx,$$

where $\varphi_m(\cdot)$ is cardinal B-spline, we used composite rectangular rule. We proved that, on the “quasi uniform” mesh, the used formula has, conditionally speaking, algebraic degree of exactness $m - 1$. Under additional assumptions, algebraic degree of exactness is m .

Zlatko Udovičić, Faculty of Sciences, Department of Mathematics, Sarajevo, Bosnia and Herzegovina

Tuesday 26.5.2009, 17:30-17:50

K. Vla

Numerical Mathematics

SAMPLE-PATH OPTIMIZATION FOR CONSTRAINED PROBLEMS

We consider simulated response problem with deterministic constraints. We use the sample-path method which approximates the expected value function (objective function without explicit form) by averaging sample response functions and thus generates a deterministic problem. The sample size varies and is determined using Bayesian approach. A derivative-free technique is used. A sequence of local quadratic models obtained by interpolation is constructed. Agreement between the objective function and the model will be ensured at a cost that might be smaller than in classical sample methods. Convergence is analyzed and numerical results are discussed.

Nataša Krejić, **Nataša Krklec**, **Katarina Vla**, Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad

Tuesday 26.5.2009, 16:50-17:10

H. Zarin

Numerical Mathematics

DISCONTINUOUS GALERKIN APPROXIMATIONS OF SINGULARLY PERTURBED BOUNDARY VALUE PROBLEMS

A two-dimensional singularly perturbed problem with two-small parameters has been considered. A nonsymmetric version of the discontinuous Galerkin method with interior penalties has been applied. On a layer-adapted mesh, a parameter-uniform error estimate in an associated norm has been proved. Numerical tests have been presented in order to illustrate theoretical results.

Helena Zarin, Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad

Section: Applied Mathematics

Wednesday 27.5.2009, 09:00-09:20	N. Damljanović
----------------------------------	-----------------------

Applied Mathematics

A ROOT PRODUCT OF LATTICES

In this paper is defined one kind of a root of a lattice and connected with this, here is given the product of lattices. We have observed some properties of that product and its applications in the fuzzy set and the coding theory.

Vera Lazarević, Mališa Žižović, Nada Damljanović, Technical Faculty Čačak, University of Kragujevac

Wednesday 27.5.2009, 10:20-10:40	Lj. Gajić
----------------------------------	------------------

Applied Mathematics

ON SOME OPTIMIZATION PROBLEM

In this lecture I am going to talk about minimization of function defined on metric space with values in set of real numbers with application in fixed point theory.

Ljiljana Gajić, Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad

Tuesday 26.5.2009, 11:50-12:10	D. L. Herceg
--------------------------------	---------------------

Applied Mathematics

ON SOME PROPERTIES OF THE AIR-CORED MEASURING TRANSFORMER

A measuring air-cored transformer, which is a part of a high voltage measuring instrument, is considered. The transformer must be linear for the whole frequency range of the measured signal. For this reason, we performed calculations in a FEM program to investigate linearity conditions. Theoretical and experimental results will be presented.

Dejana L. Herceg, Miroslav Prša, Faculty of Technical Sciences, University of Novi Sad

Wednesday 27.5.2009, 09:40-10:00	B. Iričanin
----------------------------------	--------------------

Applied Mathematics

ON SOME RATIONAL DIFFERENCE EQUATIONS' TREATMENT: QUALITATIVE VS. ANALYTIC

Recently there has been a huge interest in qualitative studying rational difference equations. The reason why exact treatment generally is not applied more often, besides the need to overcome significant difficulties posed by such a treatment, is the uncertainty of whether it is possible to establish the existence of the solution in an analytically closed form.

In papers [1] and [2] were studied solutions of some particular cases of the two classes of rational difference equations. Explicit solution of only some subclasses of these equations are given. Our aim here is to give short proofs of the main results in [1] and [2], as well as to significantly extend some of them.

REFERENCES:

- [1] R. P. Agarwal, E. M. Elsayed, Periodicity and stability of solutions of higher order rational difference equation, *Adv. Stud. Contemp. Math.*, vol. **17** (No. 2) (2008), pp. 181-201.
 [2] R. P. Agarwal, E. M. Elsayed, On the solutions of fourth-order rational recursive sequence, *Adv. Stud. Contemp. Math.*, vol. **18** (2009), 20 pp. (in press).

Bratislav Iričanin, Faculty of Electrical Engineering, University of Belgrade

Wednesday 27.5.2009, 11:20-11:40	T. Levajković
----------------------------------	----------------------

Applied Mathematics

CHAOS EXPANSIONS OF GENERALIZED RANDOM PROCESSES

Tijana Levajković, Faculty of Traffic and Transportation, University of Belgrade

Wednesday 27.5.2009, 11:40-12:10

T. Lutovac

Applied Mathematics

SOME CONTRIBUTIONS TO AUTOMATED REASONING ABOUT PERMUTATIONS IN SEQUENT CALCULI PROOF SEARCH

Permutability of sequent calculi rules is an important topic in proof search in automated theorem proving and logic programming. We propose a more precise specification of some sequent calculi rules that we use to extract necessary and sufficient conditions for permutations of these rules and to give properties about the possible forms of proofs after permutations. Our results can be useful to proof search strategies and heuristics at the implementation level of systems of automated theorem proving and logic programming.

Tatjana Lutovac, Faculty of Electrical Engineering, University of Belgrade

Wednesday 27.5.2009, 14:30-14:50

S. Marinković

Applied Mathematics

ON THE CONCEPTS OF ALMOST ORTHOGONALITY

In this paper, we consider a few types of almost orthogonal polynomials. Especially, we discuss those which can be used successfully for modeling of electronic systems which generate orthonormal basis. For the classical weight functions, we find explicit representation of almost orthogonal polynomials over classical orthogonal polynomials. Also, we use them to make least square approximation of functions.

Predrag M. Rajković, Faculty of Mechanical Engineering, University of Niš

Slađana Marinković, Faculty of Electronic Engineering, University of Niš

Tuesday 26.5.2009, 10:00-10:20

B. Mihailović

Applied Mathematics

A NEW CLASS OF MAXIMAL TRICYCLIC REFLEXIVE CACTI

A simple graph is reflexive if its second largest eigenvalue does not exceed 2. On certain conditions it turned out that there are four classes of tricyclic reflexive graphs. It is usual that the set of reflexive graphs within the limits of a given class of graphs is represented by the corresponding set of maximal graphs. In this paper we present the complete solution of this problem within one of these classes.

Bojana Mihailović, Faculty of Electrical Engineering, University of Belgrade

Tuesday 26.5.2009, 10:20-10:40

R. Milošević

Applied Mathematics

SOME CHARACTERISTICS OF RECURSIVE STRUCTURES

Here we shall consider some characteristics of the constructive algebraic systems of specific type, i.e. we shall consider the recursive structures which are constructive analogues in the classical mathematics. In fact, we shall prove that the set of numbers of all one-location partially recursive functions makes a distributive recursive structure which has the maximum and the minimum element, while for any two-location generally function this system is not a dense structure.

Radoslav Milošević, Faculty of Philosophy, University of East Sarajevo, Bosnia and Herzegovina

Wednesday 27.5.2009, 15:30-15:50

M. Milovanović

Applied Mathematics

FINANCIAL MATHEMATICS AS A BASIS FOR INVESTMENT PLANNING AND EVALUATION OF THEIR ECONOMIC EFFICIENCY

The main subject of discussion in this paper is determining the assessment of economic efficiency of investment on the basis of the results of appropriate methods of investment calculation, i.e., account based on financial mathematics. The following methods were analyzed: method of present value or capital value of investment, method of internal rate of profitability and method of annuities. Based on the results obtained in the investment calculations it is possible to answer the questions of whether the planned investment project, under certain assumptions (absolute) is economically payable and which of two or more mutually exclusive investment projects, under certain assumptions, are the most cost-effective, i.e., which is a relatively economically cost-effective.

Marina Milovanović, Union University, Belgrade

Tuesday 27.5.2009, 12:10-12:30

K. Nemeš

Applied Mathematics

THE IMPROVEMENT OF RIVER STRETCH CHARACTERIZATION FROM RELATIVE DIFFERENCES FUNCTIONS

The relative differences between functions (intercept and slope values) was obtained from linear regression of conductivity (Y) and cations and anions (X), i.e. specific conductivity. It is found that the concentration obtained for the zero difference has typical value when the exchange of season occurred.

Karolina Nemeš, Department of Biology and Ecology, Faculty of Sciences, University of Novi Sad

Wednesday 27.5.2009, 11:00-11:20

R. Nikolić

Applied Mathematics

THE WEAK ASYMPTOTIC EQUIVALENCE AND THE GENERALIZED INVERSE

In this paper we discuss the relationship between the weak asymptotic equivalence relation and the generalized inverse in the class A of all nondecreasing and unbounded functions, defined and positive for enough large positive argument. In the main theorem, we prove a proper characterization of the functional class Oregularly varying functions (in the sense of Karamata) which are nondecreasing and unbounded. These results will be used for characterisation of a sequential class to which all strictly increasing Oregularly varying sequences belong, whose numerical functions are also Oregularly varying functions. Such results are of great importance in some processes in physics.

Dragan Đurčić, Rale Nikolić, Aleksandar Torgašev, Technical Faculty Čačak, University of Kragujevac

Wednesday 27.5.2009, 10:40-11:00

M. Obradović

Applied Mathematics

ABOUT PLANAR SECTIONS OF A TYPE OF EGG CURVE BASED CONOID

Starting from a type of conoid which is based on a cubic egg curve obtained by Hügelschäffers construction, it is considered a possible occurrence of related type of conoid, which would include conic curve as a part of its plane section. The solution is accomplished by constructively geometrical methods, supported by Rhinoceros software package.

Marija Obradović, Faculty of Civil Engineering, University of Belgrade

Maja Petrović, Faculty of Transport and Traffic Engineering, University of Belgrade

Branko Malešević, Faculty of Electrical Engineering, University of Belgrade

Tuesday 26.5.2009, 10:40-11:00

M. Petrović

Applied Mathematics

TRICYCLIC GRAPHS FOR WHICH THE LEAST EIGENVALUE IS MINIMUM

The spread of a graph is defined to be the difference between the largest eigenvalue and the least eigenvalue of the adjacency matrix of the graph. In this paper we determine the unique graph with minimal least eigenvalue among all connected tricyclic graphs of order n . Also, we determine unique graph with maximal spread in this class for $n \geq 52$.

Miroslav Petrović, Bojana Borovićanin, Tatjana Aleksić, Faculty of Science, University of Kragujevac

Wednesday 27.5.2009, 09:20-09:40

Ž. Popović

Applied Mathematics

CONGRUENCES AND SEMILATTICES OF ARCHIMEDEAN SEMIGROUPS

By \mathbf{Z}^+ we denote the set of all positive integers. By S^1 we denote a semigroup S with identity 1. Let a and b be elements of a semigroup S . Then $a|b \iff b \in S^1 a S^1$, and $a \rightarrow b \iff (\exists n \in \mathbf{Z}^+) a|b^n$. Using previous relations we will define the following relation $\rightarrow = \rightarrow \cap (\rightarrow)^{-1}$. A semigroup S is *Archimedean* if $a \rightarrow b$, for all $a, b \in S$. A congruence relation ρ on a semigroup S is called a band congruence if S/ρ is a band.

M. S. Putcha, in 1973, proved that a semigroup S is a semilattice of Archimedean semigroups if and only if $a|b \implies (\exists n \in \mathbf{Z}^+) a^2|b^n$. P. Protić, in 1991, and S. Bogdanović and M. Ćirić, in 1992 and 1993, have given some equivalent statements for Putcha's theorem.

In this paper, for $m, n \in \mathbf{Z}^+$, we define a relation $\rho_{(m,n)}$ by

$$(a, b) \in \rho_{(m,n)} \iff (\forall x \in S^m)(\forall y \in S^n) xay \rightarrow xby,$$

which is a congruence relation on an arbitrary semigroup S . Using the congruence relation $\rho_{(m,n)}$ we will give some new characterizations of semilattice of Archimedean semigroups.

Stojan Bogdanović, Žarko Popović, Faculty of Economics, University of Niš

Wednesday 27.5.2009, 14:50-15:10

P. Rajković

Applied Mathematics

THE GENERALIZED BORWEIN CONJECTURE AND PARTITIONS OF NATURAL NUMBERS

In this paper, we have considered a generalization of the conjecture which was set up by P. Borwein in 1990. We have proved some properties of generalized Borwein polynomials. A few infinite versions of ordinary and generalized Borwein conjecture are also considered. We gave an explicit formula for the coefficients of infinite Borwein series and proved that all sequences of coefficients are particular solutions of the same inhomogeneous difference equation. Finally, we found the one sequence of counterexamples for the considered generalization and gave modified conjecture for that sequence.

Predrag Rajković, Faculty of Mechanical Engineering, University of Niš**Marko D. Petković**, Department of Mathematics, Faculty of Science, University of Niš

Wednesday 27.5.2009, 15:10-15:30

J. Stanojević

Applied Mathematics

RELATION BETWEEN HEAVY TAILS, SELF-SIMILARITY AND LONG-RANGE DEPENDENCE

The heavy tails distributions are models for more important problems in real life like foresee Internet traffic or problems in finance crack. There suggestion more statistical methods for identification that distributions and there are used on difference date from Internet. Many studies gave results that there data indicated on characteristics self-similar process. Real Internet traffic also indicate on long-range dependence and large explosive during large times on times scale, which is the major difference from traditional Poisson's model. Some suggestion explanation of that phenomenon are based on supposition on distribution with heavy tails.

Jelena Stanojević, Faculty of Economy, University of Belgrade

Tuesday 26.5.2009, 12:30-12:50

N. Stojković

Applied Mathematics

FINDING INITIAL BASIC FEASIBLE SOLUTION IN SIMPLEX ALGORITHM

We investigate the problem of finding the initial basic feasible solution in the simplex algorithm. Two modifications of the two-phase simplex method are presented. Implementations of the two-phase simplex method and its modifications in the programming package MATHEMATICA and the programming language Visual Basic are written. We report computational results on numerical examples from the Netlib test set.

Nebojša V. Stojković, Faculty of Economics, University of Niš**Marko D. Petković**, **Predrag S. Stanimirović**, Department of Mathematics, Faculty of Science, University of Niš

Tuesday 26.5.2009, 11:30-11:50

N. Teofanov

Applied Mathematics

MOBILE COMMUNICATION SYSTEMS AS A MOTIVATION FOR THE STUDY OF PSEUDODIFFERENTIAL OPERATORS

Pseudodifferential operators are a classical subject of mathematical analysis, basically used in PDEs. In the last 15 years, a new approach, based on time-frequency analysis, made the subject interesting from signal analysis point of view. We show how pseudodifferential operators appear in modeling mobile wireless communication systems.

Nenad Teofanov, Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad

Section: Informatics

Tuesday 26.5.2009, 16:30-16:50

M. Banjanin

Informatics

PRINCIPLES OF DESIGNING INSTRUCTIVE DISPLAYS FOR THE INTERACTION MAN-SYSTEM

The concept of display is often closely connected with the graphical user interface (GUI) which usually describes drawings and often involves controls and answers which are used to manage the display in the interaction. In the creating of displays aimed for communication of client or operator (user) and system, there are in usage thirteen main principles whose importance depends on task categories for which displays are intended. According to tasks which are defined by complexity of interactions man-operator or operator and system, purpose of display can be: for navigation or operational control (nautical), for controlling system parameters and process performances (control), for making operating and instant decisions (conclusive) and for learning (instructive). After tasks defining and objectives, follows a detailed analysis of information for identification what the customer-operator has to know to solve the given task. In this paper are analyzed principles of display creating, grouped into four different categories: principles of perception (transparency and uniformity, display processing and redundancy, similarity of discriminative elements), principles of mental models (image realism and locomotive elements), principles which are based on the attention (optimization of relevance, compatibility of proximity and multiples of information source) and principles of memory (visualization, predictive support and consistency).

Milorad Banjanin, Faculty of Technical Sciences, University of Novi Sad

Anton Vrdoljak, Faculty of Civil Engineering, University of Mostar, Bosnia and Herzegovina

Tuesday 26.5.2009, 15:00-15:20

J. Hadži-Purić

Informatics

CLUSTERING NUMERICAL AND NOMINAL DATA: HYBRID APPROACH

A new efficient procedure for clustering both numerical and nominal data is presented in this paper based on new concept of cluster representatives. Experimental results on UCI datasets (as benchmarks) are given. Those results establish that implemented procedure produces good quality clusters.

Jelena Hadži-Purić, Faculty of Mathematics, University of Belgrade

Tuesday 26.5.2009, 17:10-17:30

D. Ivanović

Informatics

SYSTEM SOFTWARE ARCHITECTURE OF BIBLIOGRAPHIC DATA

System of bibliographic data relates to the cataloguing published scientific research results. Those are the papers published in the journals, monographs and proceedings. This paper describes system software architecture for recording data about papers. The basic characteristic of this architecture lies in the fact that data model supports the MARC 21 bibliographic standard and that knowledge of this standard is not necessary for creating data. Modelling of proposed multitiered client-server architecture will be done using CASE tools which support UML 2.0.

Dragan Ivanović, Branko Milosavljević, Faculty of Technical Sciences, University of Novi Sad

Tuesday 26.5.2009, 17:30-17:50

I. Pribela

Informatics

TESTING STUDENTS' PROGRAMMING ASSIGNMENTS

The testing system developed at our Department allows students to test their assignments in a controlled manner during lab classes and practical exercises. The system is independent of underlying platform and programming language used for solutions and can be employed for different programming languages and wide range of programming courses.

The system allows instructor to run the same tests on a set of student assignments. The results of the tests are recorded in a log file and are available to both students and the instructor. The system accepts any file types as assignments and the instructor has great flexibility in specifying how and what is to be tested. Such manner of evaluating practical programming assignments offers greater flexibility in everyday teaching and obtains objectiveness.

Ivan Pribela, Mirjana Ivanović, Zoran Budimac, Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad

Tuesday 26.5.2009, 15:20-15:40

D. Radaković

Informatics

DYNAMIC STRONGLY TYPED EXPRESSION EVALUATOR

We present a dynamic, strongly typed expression evaluator and a parser, which is a part of our dynamic geometry software. Properties of geometric shapes, such as location, size and orientation can be bound to expressions, which can be dependent on properties of other objects and are evaluated dynamically. We propose an object-oriented approach, i.e. all geometric shapes are considered as objects with properties, any of which can be bound to an arbitrary expression. That way a geometric drawing can be animated by changing one or more parameters. Our expression evaluator supports data types, named variables, accessing properties of objects, mathematical functions and conditional evaluation. Besides, we propose a simple extensibility mechanism, which enables us to easily implement new functions and function libraries and include them in the evaluator.

Davorka Radaković, Đorđe Herceg, Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad

Markus Löberbauer, Institute for System Software, Johannes Kepler University, Linz

Tuesday 26.5.2009, 17:50-18:10

G. Rakić

Informatics

TOWARDS THE BETTER SOFTWARE METRICS TOOL

Systematic application of software metrics techniques during the software development process can point to the weaknesses in the software project and so, lead to significant improvement the quality of a software product. One of the open questions in this area is lack of wider acceptance and application of software metrics techniques and tools. In this paper we investigate main limitations of actual software metrics techniques and tool and propose move toward to better software metrics tool which would fill main imperfection and unsuitability of currently available techniques and tools. Better software metrics tool would lead to wider application of software metrics and to higher quality of software products.

Gordana Rakić, Zoran Budimac, Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad

Tuesday 26.5.2009, 16:50-17:10

G. Rudić

Informatics

MODELLING CONSTRAINTS ON MARC 21 BIBLIOGRAPHIC RECORDS

There are several types of XML schema for presenting bibliographic records. Moreover, there are software systems that can generate object model on the basis of the given XML schema. One of the object models created in that way for MARC 21 bibliographic format will be chosen in this paper for demonstrating modelling of the constraints. For the purpose of modelling constraints the analysis of the MARC 21 format will be given. The analysis will focus on observing and systematisation of the constraints and dependencies between data for description of bibliographic material. Specification will be realized in chosen CASE tool that supports development of UML 2.0 object models and OCL 2.0 constraints.

Bojana Dimić, Gordana Rudić, Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad

Tuesday 26.5.2009, 15:40-16:00

D. Todorić-Vukašin

Informatics

USE OF ORACLE WORKFLOW MANAGEMENT SYSTEM IN THE STUDENT AFFAIRS INFORMATION SYSTEM

The services of a Student Affairs Office depend strongly on the scope and the effectiveness of the Student Affairs Information System (SAIS). The management of SAIS requires powerful and flexible techniques. An appropriate approach has to cover the dynamics of processes and their needs for communication, coordination and information. A most promising approach is the application of workflow management systems. They support the modeling and execution of workflows, which focus on the behavioral aspects of business processes. Oracle Workflow Management System provide features for the design and the implementation of (workflow based) SAIS. It allows integration of existing application systems and the simultaneous consideration of manual and automated activities. The theoretical background and preliminary results of introduction workflow technology in the Student Affairs Information System will be presented in this paper.

Dragana Todorić-Vukašin, Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad

Miodrag Milićević, Higher Technological School of Professional Studies, Šabac

Section: Teaching of Mathematics and Computer Science

Tuesday 26.5.2009, 12:50-13:10

N. Budinski

Teaching of Mathematics and Computer Science

ORIGAMI IN MATHEMATICS - AN EXAMPLE OF A TEACHING MODEL

This paper discusses how can origami be applied in teaching mathematics. The ancient Japanese skill of folding paper can be used at classes and lessons related to polyhedrons. The paper involves examples of using origami at classes and discusses benefits of it. The basic rule of learning is that when we hear we forget, when we see, we remember, when we do, we understand. The origami supports all three elements and students become more interested in polyhedron issues. Integrating origami in the classical way of teaching mathematics can enhance the teaching process in a creative and interesting way.

Natalija Budinski, Primary and Secondary School "Petro Kuzmjak", Ruski Krstur

Wednesday 27.5.2009, 14:30-14:50

Lj. Diković

Teaching of Mathematics and Computer Science

VIZUELNI PRISTUP IZVODU FUNKCIJE PODRŽAN WEB TEHNOLOGIJAMA

Da bi ublažili teškoće u razumevanju nastave diferencijalnog računa nastavnici često upadaju u zamku stavljajući akcenat na seriju rutinskih pravila koje studenti treba da usvoje, što nažalost ne doprinosi suštinskom, konceptualnom razumevanju materije. U radu je prikazan dosadašnji metodički pristup nastavnoj jedinici o izvodu funkcije, pri čemu je ukazano na neke kritične tačke pri izvođenju nastave sa predlozima za njihovo prevazilaženje. Rad sadrži prilog stimulativnih e-resursa za pojačavanje konceptualnog razumevanja izvoda funkcija u cilju implementacije vizuelnog i dinamičnog metodičkog pristupa u nastavi o izvodu funkcija.

Ljubica Diković, Dragić Banković, Visoka poslovno-tehnička škola strukovnih studija, Užice

Tuesday 26.5.2009, 11:30-11:50

D. Herceg

Teaching of Mathematics and Computer Science

PRIBLIŽNI BROJEVI U NASTAVI MATEMATIKE

U osnovnoj i srednjoj školi približni brojevi se pojavljuju kao tema i kao deo računanja ili rešavanja zadataka. U svakodnevnom životu približni brojevi su takođe prisutni. Upotreba računara je čak povećala potrebu za upoznavanjem približnih brojeva. Kratkim pregledom kroz udžbenike osnovne i srednje škole prikazaćemo kako se obrađuju približni brojevi, a primerima iz života ilustrovaćemo prisustvo približnih brojeva u različitim situacijama.

Dragoslav Herceg, Departman za matematiku i informatiku, Prirodno-matematički fakultet, Univerzitet u Novom Sadu

Tuesday 26.5.2009, 10:20-10:40

P. Körtesi

Teaching of Mathematics and Computer Science

SPECIAL MATHEMATICS FOR TALENTED UNIVERSITY STUDENTS

For about 30 years in the tertiary studies it is organized the Hajos Mathematics competition in Hungary. It started for the colleges in Hungary, but due to the Bologna changes the competition was extended for the BSc level for any university or college level institution.

I would like to present some of the problems in the past years, and to reflect on the possibilities to include some interesting chapters of the basic, university level Mathematics, which are not anymore included in the basic curricula, due to massive reductions in time allocated to Mathematics in the new system.

Péter Körtesi, University of Miskolc, Hungary

Wednesday 27.5.2009, 10:40-11:00

V. Krekić Pinter

Teaching of Mathematics and Computer Science

METODA POKUŠAJA I POGREŠAKA U POČETNOJ NASTAVI MATEMATIKE

Mnogi savremeni metodičari nastave matematike naglašavaju vodeću ulogu stvaralačke metode rešavanja problema, koja omogućuje učeniku da samostalno izgrađuje modele rešavanja istih. Činjenica je, da u početnoj nastavi matematike ima malo primera koji se mogu rešavati pomoću klasičnih matematičkih metoda i modela (koji još nisu ni formirani), pa se zato rešavanju mnogih problema prilazi kreativno, na osnovu originalnih, pa i neobičnih

načina rešavanja. Ovaj pristup rešavanju problema pretpostavlja vođenje matematičkog obrazovanja, koji respektuje kibernetičko gledanje na nastavu kao upravljiv proces i podrazumeva primenu kibernetičkih nastavnih metoda. Na ovom nivou obrazovanja od kibernetičkih metoda se izdvaja metoda "pokušaja i pogrešaka". Metoda pokušaja i pogrešaka se sastoji u tome da se načine slučajni pokušaji, kako bi se rešio neki problem. Put do rešenja je usmeren, "hipoteze" se stalno proveravaju. Pogrešni pokušaji se koriguju ili odbacuju, a dobri se dalje razrađuju. Dakle ova metoda implicira i metodu "lažne pretpostavke", pa bi je uslovno mogli nazvati i metodom "hipoteze". Metoda hipoteze se već primenjuje u početnoj nastavi matematike, posebno u sferi nižih nivoa reprezentacija (konkretni i ikonički nivo). Elementi logike, kombinatorike, geometrijski problemi, pa i problemi verovatnoće su odlične prilike za intuitivno rešavanje problema, kroz igru, metodom pokušaja i pogrešaka, odnosno metodom hipoteze.

Janoš Pinter, Valerija Krekić Pinter, Učiteljski fakultet na mađarskom nastavnom jeziku, Subotica

Tuesday 26.5.2009, 12:30-12:50

E. Ljajko

Teaching of Mathematics and Computer Science

GEOGEBRA AND HIGH SCHOOL ANALYTIC GEOMETRY INSTRUCTION

All modern versions of educational software simply attract high school teachers as well as their students to apply them in the process of teaching/learning mathematics. GeoGebra offers extraordinary high possibilities to modernize the process of teaching/learning analytic geometry in high schools. Nevertheless, how efficient is such a process? How much effort should teachers and students invest in the process to combine GeoGebra and mathematics in a meaningful manner? Does such an effort pay off?

In this article we try to answer these and other similar questions. Our source of information was an experimental instruction we held in Technical school "Nikola Tesla" in Leposavić, Serbia. Results of earlier researches in this field (dr Dragoslav Herceg, 2003-2008; dr Radivoje Stojković, 2003-2006) were used while organizing and carrying out the instruction process. GeoGebra was embedded in the analytic geometry instruction using appropriate dynamic worksheets. There are shown in the article some of the worksheets used, as well as possible ways to organize and perform such a process of teaching/learning, ways to organize an appropriate classroom and advantages and disadvantages of the process.

Eugen Ljajko, Faculty of Sciences, Kosovska Mitrovica

Zlatka Pavličić, Technical School "Nikola Tesla", Leposavić

Wednesday 27.5.2009, 09:40-10:00

B. Malešević

Teaching of Mathematics and Computer Science

MATEMATIKA ANTIKITERA MEHANIZMA

Antikitera mehanizam je do sad najstariji sačuvan astronomski računar. Razmatra se kvalitet nekih racionalnih aproksimacija koje su korišćene u konstrukciji Antikitera mehanizma.

Branko Malešević, Elektrotehnički fakultet, Univerzitet u Beogradu

Wednesday 27.5.2009, 09:20-09:40

S. Maletin

Teaching of Mathematics and Computer Science

KOMPJUTERSKE NAUKE U OSNOVNOJ I SREDNJOJ ŠKOLI U SVETU I KOD NAS

Najnovije tendencije u nastavi informatike (The New Educational Imperative, CSTA, 2005) definišu se tri osnovne nastavne celine: Obrazovna tehnologija (Educational Tehnology) – korišćenje računara u nastavi, Informacione tehnologije (Information Tehnology) – korišćenje hardvera i softvera, i Kompjuterske nauke (Computer Science - CS) – dizajniranje i implementacija softvera, razvijanje efektivnih načina za rešavanje kompjuterskih problema, pronalaženje novih puteva za upotrebu računara.

Razvoj hardvera i softvera u današnje vreme uslovio je veliki broj korisničkih alata te se učenje informatike u osnovnim i srednjim školama uglavnom bavi savladavanjem istih, odnosno takozvanom računarskom pismenošću. Učenje samih kompjuterskih nauka, pre svega učenje programiranja, programskih jezika, programske paradigme i nadasve logike zastupljeno je veoma malo i uglavnom veoma raznoliko. Rad se bavi analizom koliko i kako su zastupljene u obrazovanju u osnovnim i srednjim školama kompjuterske nauke kod nas i u svetu. Materijal je prikupljen iz strategija obrazovanja u SAD, Rusiji, Litvaniji i nekim zemljama okruženja, a prikazuje i neke polemike oko učenja programiranja.

Svetlana Maletin, Gimnazija "Jovan Jovanović Zmaj", Novi Sad

Miloš Racković, Departman za matematiku i informatiku, Prirodno-matematički fakultet, Univerzitet u Novom Sadu

Wednesday 27.5.2009, 11:00-11:20

S. Maričić

Teaching of Mathematics and Computer Science

REFORMULISANJE PROBLEMA KAO KOMPONENTA KRITIČKOG MIŠLJENJA U POČETNOJ NASTAVI MATEMATIKE

U radu autori polaze od zahteva za razvijanjem kritičkog mišljenja učenika koji je eksplicitno istaknut kao cilj i zadatak u programu nastave matematike od prvog do četvrtog razreda osnovne škole. Istovremeno ukazuju na složenost i kompleksnost pojma kritičko mišljenje i potrebu da se taj pojam operacionalizuje kako bi se u nastavnoj praksi mogao uspješnije realizovati. Kritičko mišljenje određuju kao složenu intelektualnu sposobnost koja u sebe uključuje više različitih komponenti, a za potrebe ovog rada izdvajaju jednu njegovu komponentu - reformulisanje problema i ukazuju na neke mogućnosti razvijanja ove sposobnosti u procesu početne nastave matematike.

Krstivoje Špijunović, Sanja Maričić, Učiteljski fakultet, Užice

Wednesday 27.5.2009, 14:50-15:10

M. Milićević

Teaching of Mathematics and Computer Science

MULTIMEDIA TOOLS APPLICATION IN EDUCATION

The work explains the application of multimedia tools in education. New information technologies are used more in education, so the old traditional methods are replaced with new, with modern multimedia tools application. The tools from the Adobe movement (Macromedia) which can be used in instruction are presented in this work, as well as research on multimedia tools application in some educational institutions.

Miodrag Milićević, Higher Technological School of Professional Studies, Šabac

Dragana Todorčić-Vukašin, Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad

Wednesday 27.5.2009, 15:10-15:30

M. Milošević

Teaching of Mathematics and Computer Science

NAČINI PROVERE ZNANJA IZ OBLASTI INFORMATIKE UČENIKA GIMNAZIJE

U radu se obrađuju pitanja klasičnog i savremenog načina praćenja i kontrole znanja učenika iz oblasti informatičkih sadržaja, obuhvaćenih u nastavnim planovima i programima gimnazijskog obrazovanja. U uvodnom delu daje se osvrt na prednosti i nedostatke klasičnog-tradicionalnog, te se ukazuje na mogućnosti i potrebe savremenog-kompjuterskog praćenja i ocenjivanja znanja učenika. Posebno se ukazuje na proveru znanja učenika u Republici Srbiji i okruženju, iz područja aplikativnih softvera i programiranja u programskim jezicima C i Pascal-u, kao i programskom okruženju Delphi. Pored toga, ukazuje se na mogućnosti samokontrole i praćenja postignutog znanja. Sadržaj rada baziran je na podacima sa Interneta i iskustvima profesora.

Marija Milošević, Gimnazija "Jovan Jovanović Zmaj", Novi Sad

Miloš Racković, Departman za matematiku i informatiku, Prirodno-matematički fakultet, Univerzitet u Novom Sadu

Wednesday 27.5.2009, 09:00-09:20

M. Milovanović

Teaching of Mathematics and Computer Science

THE ROLE OF MULTIMEDIA LEARNING IN TEACHING AND LEARNING MATHEMATICS: MULTIMEDIA LESSONS ON INTEGRALS

Teaching mathematics has been greatly improved in recent years by computer visualization techniques. Visualization offers great help in process of presenting mathematical principles, theorems or problems. This research refers to the role of the computer-multimedia in teaching and learning lessons on Integrals. The study was performed on first year university students divided in two groups of thirty-six students each. The traditional method of learning integrals was presented in first group (traditional group) and multimedia method was presented in second group (multimedia group). Multimedia lessons are introduced with help of computer, using the programme package, made in HTML, Flash, Java Script, in agreement with the ten Mayer's principles. After traditional and multimedia lessons the students were tested. The students in multimedia group had considerably better scores from the test. The questionnaire feedback shows that learning mathematics by multimedia gives students the additional motivation and power of visualization.

Marina Milovanović, Union University, Belgrade

Wednesday 27.5.2009, 11:20-11:40

M. Mladenović

Teaching of Mathematics and Computer Science

UTICAJ GRUPNOG OBLIKA RADA NA DIFERENCIRANJE U NASTAVI MATEMATIKE

U pedagoškoj praksi, naročito sam grupni oblik rada se koristi na časovima matematike od petog do osmog razreda: redovne, dopunske i dodatne nastave.

Takav vid rada omogućava da se učenik posmatra kao subjekt u nastavnom procesu odnosno u celokupnom obrazovno-vaspitnom procesu.

Tim oblikom se učenik osposobljava za permanentno obrazovanje, a to na prvom mestu podrazumeva učiti *učenje*.

Grupni oblik omogućava novi položaj učenika i nastavnika u tom prenošenju i sticanju znanja, kao i korišćenjem raznovrsnih izvora informacija.

Celokupan nastavni proces se usavršava na jedan viši nivo učenja - *učenja*, uz visok stepen angažovanja svakog učenika.

Grupni oblik rada pomaže diferenciranju odeljenja po principu individualnosti. On pomaže da se učenici nađu u direktnom odnosu sa raznoraznim izvorima znanja i da ih aktivno koriste u trajnom sticanju znanja, navika i umenja.

Značajna karakteristika diferencirane nastave je da se učenicima pružaju jednake šanse za napredovanje. To znači da učenik koji uspešno savladava programske zahteve jednog nivoa može biti premešten u grupu narednog nivoa. Pri tom se kao značajan problem u uslovima delimične primene diferencirane nastave u našim školama nameće i problem ocenjivanja učenika, pa i iz nastave matematike.

Rešenje ovog problema je u pružanju mogućnosti svakom učeniku da bira i rešava zadatke, prema vlastitoj proceni i sposobnosti i sposobnostima može se rešiti, ako mu se ponudi list sa zadacima sva tri (pa i četiri) nivoa složenosti.

U radu će biti prezentirana lična istraživanja nastavnika u pedagoškoj praksi učenika o petog do osmog razreda u osnovnoj školi.

Biće prezentirana kvantitativna i kvalitativna analiza istraživanja u neposrednoj nastavi matematike korišćenje grupnog oblika rada i uticaja na diferencijaciju samog nastavnog procesa, kao i uticaju pojedinačnog i kolektivnog napretka u pogledu podizanja kvaliteta nastave matematike u osnovnoj školi.

Miroslav B. Mladenović, Osnovna škola "Braća Milenković", selo Šišava, Vlasotince

Tuesday 26.5.2009, 12:10-12:30

B. Prentović

Teaching of Mathematics and Computer Science

ANALIZA OPŠTE KVADRATNE JEDNAČINE

Analiza opšte kvadratne jednačine sa dve promenljive, je problem koji se obično rešava u okviru realizacije gradiva analitičke geometrije, tačnije prilikom obrade opšte teorije krivih drugog reda. Kako ova analiza zahteva veoma obimna računanja, za koje je potrebno i značajno vreme, obično, u dosadašnjoj (tradicionalnoj) nastavnoj praksi, njoj se ne posvećuje dovoljna pažnja. Međutim, u novije vreme, uvođenjem računara i računarskog obrazovnog softvera u nastavni proces, stvaraju se uslovi za detaljno rasvetljavanje ovog problema, uz značajnu uštedu vremena. Drugim rečima, nastava putem računara, kao nov nastavni sistem, stvara uslove za uspešnu realizaciju ovih nastavnih sadržaja. U radu će biti korišćene poznate transformacije podudarnosti: rotacija i translacija. Računar pruža mogućnost da se ove transformacije primenjuju direktno na geometrijske figure (tačke, prave, krive, ...), a ne na transformacije koordinatnog sistema, pri čemu se kao rezultat dobijaju odgovarajuće ekvivalentne jednačine. Za realizaciju navedenih sadržaja koriste se programi Mathematica i GeoGebra.

Dragoslav Herceg, Departman za matematiku i informatiku, Prirodno-matematički fakultet, Univerzitet u Novom Sadu

Branko Prentović, Visoka škola strukovnih studija za obrazovanje vaspitača, Kikinda

Tuesday 26.5.2009, 10:00-10:20

Đ. Takači

Teaching of Mathematics and Computer Science

ADVANCE MATHEMATICAL THINKING AND COMPUTER

In this paper we present the role of the program packages Scientific Workplace and GeoGebra in teaching and learning the examining of the graphs of functions and some related contents from advanced mathematics. A questionnaire on this matter was given to high school students, and we make a short analysis of the obtained results. As expected, the students taught by a computer had significantly better results in examining functions than those taught in a classical way.

Đurđica Takači, Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad

Tuesday 26.5.2009, 10:40-11:00

J. Tatar

Teaching of Mathematics and Computer Science

INTUITIVNA PREDSTAVA "BESKONAČNOSTI"

Granične vrednosti i beskonačno male veličine, uz pojmove zavisne i nezavisne promenljive, možemo smatrati osnovnim pojmovima diferencijalnog i integralnog računa, te i njihovo razumevanje predstavlja osnovu za razumevanje diferencijalnog i integralnog računa. Formalno uvođenje graničnih procesa, ne retko, izaziva izvesne probleme, pa se u radu sa učenicima, pri uvođenju ovih pojmova kao i radu sa njima, u velikoj meri oslanjamo na intuiciju učenika. Pri izračunavanju graničnih vrednosti niza i pri operacijama sa graničnim vrednostima niza (i graničnim procesima uopšte), često smo u situaciji da baratamo pojmom "beskonačno" i oznakama " $+\infty$ " i " ∞ ". Kada se pri uvođenju nekog pojma oslanjamo na intuitivnu sliku koju učenici imaju, potrebno je da proverimo kakva je ta slika kao i da identifikujemo one stvari koje mogu izazvati konfliktne situacije u toj predstavi. Ovde ćemo izložiti rezultate testiranja učenika urađenog pre izučavanja nastavne teme *Nizovi*, koje je trebalo da nam pokaže kakvu intuitivnu predstavu učenici imaju o beskonačno velikim i beskonačno malim veličinama.

Jelena Tatar, Gimnazija "Jovan Jovanović Zmaj", Novi Sad

Tuesday 26.5.2009, 11:50-12:10

A. Vrdoljak

Teaching of Mathematics and Computer Science

THE EDUCATIONAL POTENTIAL OF DYNAMIC MATHEMATICS SOFTWARE: THE CASE OF GEOGEBRA

Dynamic mathematics software with their dynamic learning environments are today's the best ways to foster an active learning process. Recently there are a number of studies which have demonstrated that technologies have an essential educational potential to develop students' basic skills and expand their knowledge. In this paper we will focus on GeoGebra, a sort of freely available, open source and multiplatform dynamic mathematics software for schools that joins geometry, algebra and calculus. The idea, which led to this paper, is aimed in the direction to explore whether and in how big scale GeoGebra can contribute for improvement in acquiring of pupils' knowledge and skills regarding dynamic teaching and learning of mathematics?

Anton Vrdoljak, Faculty of Civil Engineering, University of Mostar, Bosnia and Herzegovina**Milorad Banjanin, Jelena Matković**, Faculty of Technical Sciences, University of Novi Sad

Wednesday 27.5.2009, 10:20-10:40

M. Živanović

Teaching of Mathematics and Computer Science

TROUGLOVI SA CELOBROJNIM STRANICAMA I UGLOM OD 60 STEPENI

U radu će biti predstavljene klase trouglova sa celobrojnim stranicama i unutrašnjim uglom od 60 stepeni. Rešenje je novo pa je ujedno i prilog modelu učenja na više načina. Takođe tabelarnim prikazima biće postavljeno nekoliko klasa ovakvih trouglova što u praksi daje konkretne pogodne primere.

Milan Živanović, Tehnička škola, Bajina Bašta